CASE STUDY REPORT #59
SAN PEDRO VALLEY AND NORTH COAST WATER DISTRICTS
SAN PEDRO CREEK

I. Project Description

San Pedro Creek is in the coastal mountains of San Mateo County south of San Francisco. This short coastal stream has three principal branches -- North, Middle and South Forks encompassed by a watershed of about 741 square miles. The main stem San Pedro Creek is about 2.3 miles long and flows at a low gradient through San Pedro Valley to the Pacific Ocean. The Middle and South Forks are short spring-fed tributaries of the main stem of San Pedro Creek. Streamflows on the South and Middle Forks are diverted for municipal water supply in the San Pedro Valley by the North Coast Water District. At the points of diversion, water is collected in holding tanks from where it is either withdrawn by the water district or released to the stream.

The water district began diverting water on the South Fork in 1967 (Water Application No. 16162) and diversion of flows on the Middle Fork began in 1973 (Water Application No. 22622). An additional diversion on the South Fork has been applied for by the district but has not been granted by the State Water Rights Board due to protests filed by the Department of Fish and Game. The location of these existing and proposed diversions are shown in Figure 1.

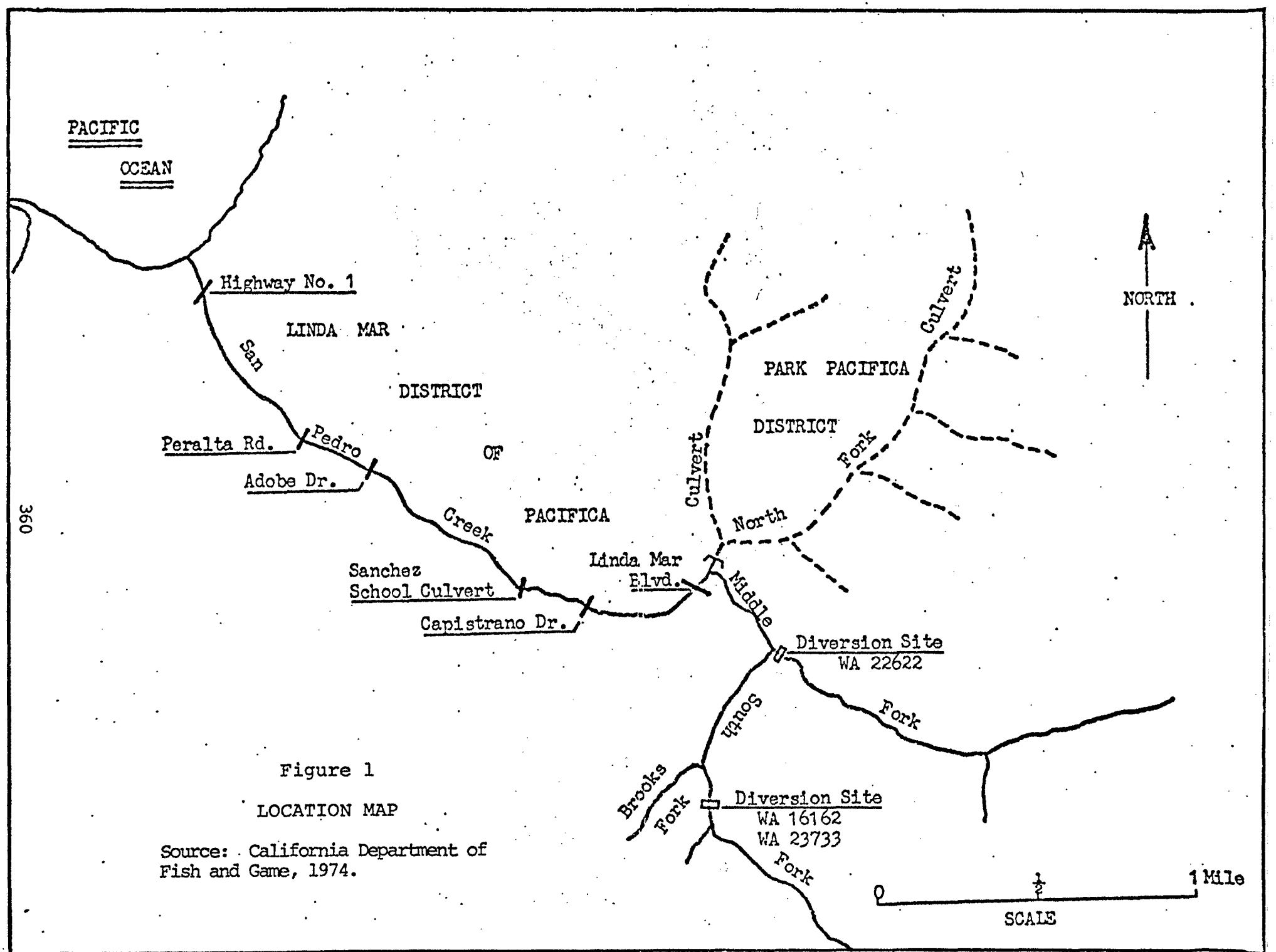

Figure 1

LOCATION MAP

Source: California Department of Fish and Game, 1974.

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II. Pre-Project Conditions

The San Pedro Valley floor has undergone extensive urban development including the Linda Mar District of Pacifica located next to the lower reach of San Pedro Creek. Coinciding with this urbanization, several short sections of the creek have been channelized. The North Fork San Pedro Creek presently flows underground through a culvert as shown in Figure 1. Due in part to the large amounts of soil that have been covered with pavement or structures, storm runoff is rapid and peak streamflows fluctuate accordingly.

The stream channels of the Middle and South Forks are spring fed and drain undeveloped public lands. However, the natural flow of the Middle and South Forks has been altered by the diversion of water by the North Coast County Water District. The water diverted from each tributary of the main stem is used to accommodate increasing domestic and municipal water demands in the San Pedro Valley.

There are no streamflow gauging stations on San Pedro Creek, but a pre-project flow regime was calculated for the dry season and reported in the water district's Environmental Impact Report.

In this minimum flow pattern (dry year analysis), the South Fork discharges 0.70 cfs, the Middle Fork 0.90 cfs, and the flow is 1.35 cfs in the upper main stem and 1.55 cfs in the

lower main stem. The South Fork yields 78 percent of the lower Middle Fork flow and 52 percent and 45 percent of the upper and lower mainstem flow, respectively.

Some actual streamflow measurements were made in the summer of 1972 by University of California students studying the stream (Erman, et.al., 1973). The partial streamflow hydrograph shown in Figure 2 represents measurements taken on the main stem of San Pedro Creek prior to the operation of the district's Middle Fork diversion. Also noted during this 1972 study were some chemical parameters measured on the main stem. Average values recorded in the stream discharges during the study period are listed below.

Hardness	220 mg/l
Dissolved oxygen	9.4 mg/l
Percent saturation of dissolved oxygen	91.2 percent
Water temperature	64°F
pH	7.44

Fisheries surveys conducted by the Department of Fish and Game have shown that the San Pedro Creek drainage supports viable populations of steelhead trout, prickly sculpins, three-spined sticklebacks, and lamprey eel. Small-sized sand sole and starry flounders are found in the creek's tidal estuary.

The steelhead trout populations are considered an important existing fisheries resource in the San Pedro drainage. This is the first watershed south of the heavily populated San Francisco Bay area that continues to support runs of steelhead trout.

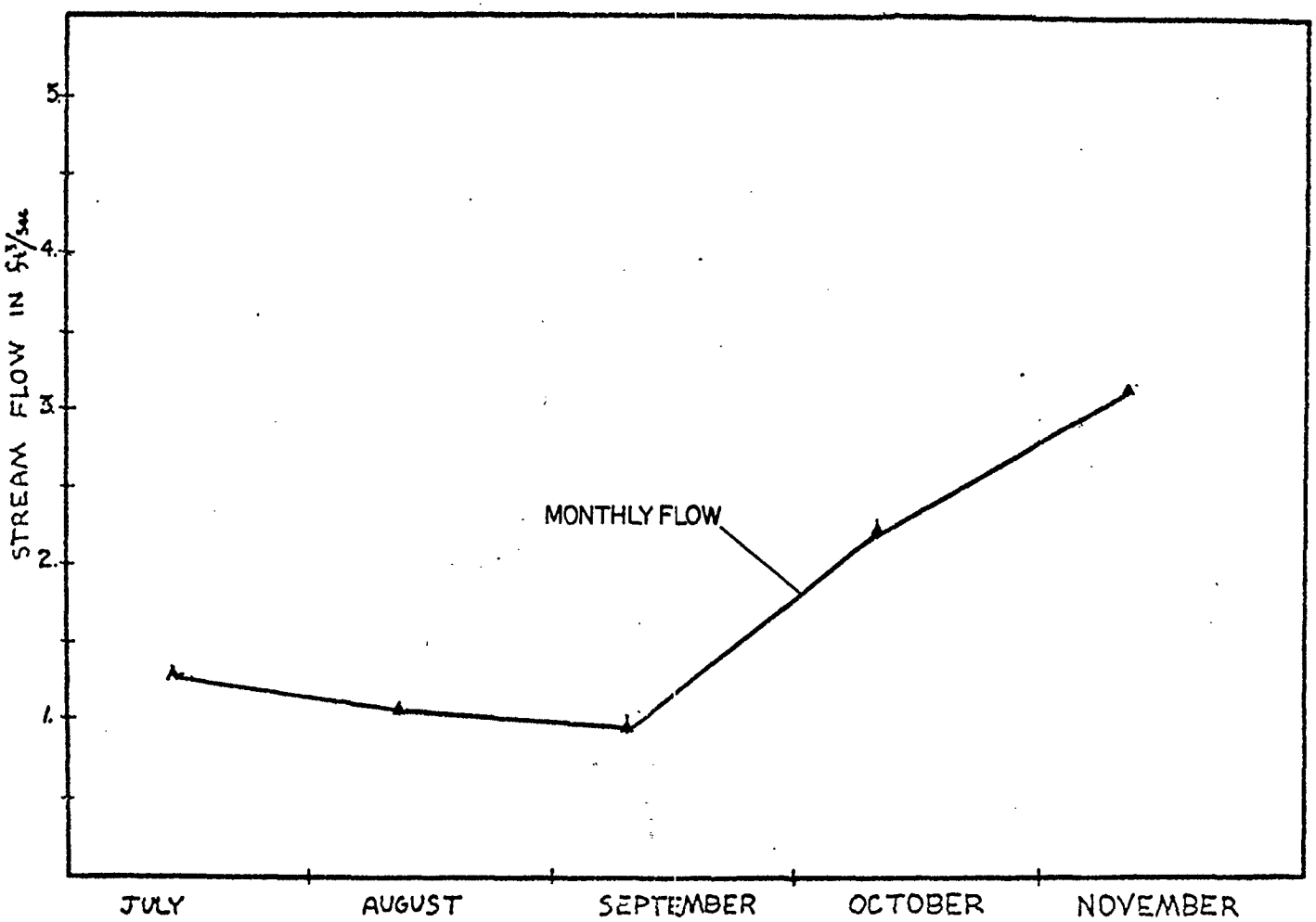

Figure 2

MEAN MONTHLY INSTREAM FLOW,
SAN PEDRO CREEK, 1972

Source: California Department of
Fish and Game, 1974.

Estimates of angler use on this stream were not found but most of the angler use occurs during the general trout season. Trout caught during this time are actually juvenile steelhead.

The annual steelhead run was estimated by the Department of Fish and Game to be 100 to 250 adults, depending on the streamflow conditions during the water year. There are no available counts of adult steelhead in the San Pedro drainage basin. These estimates were based on the back calculation of the quantitative samplings of juvenile steelhead in the stream during late summer and on visual observations made during the adult spawning runs. The average size of adult steelhead in the San Pedro Creek drainage is 13 to 20 inches which is smaller than steelhead found in larger drainages.

Peak streamflows, corresponding to the storm runoff, stimulate the upstream migration of the steelhead and provide passage for the fish over shallow riffles and other barriers. Upstream migration usually occurs between late November and April.

Migration hazards and potential impediments to the free upstream passage of steelhead exist at the Sanchez School pedestrian culvert and Capistrano Drive drop structure. The Department of Fish and Game has submitted detailed plans for fish passage facilities which were installed in October 1975.

During normal water years when sufficient streamflows are present, steelhead trout utilize four miles of stream in the San Pedro Creek drainage. Steelhead spawning and nursery habitat is provided in the main stem creek (2.3 miles), Middle Fork (1.3 miles), and lower reach of South Fork (0.4 mile).

Most of the spawning areas are located in the main creek and the Middle Fork while the South Fork possesses little acceptable spawning gravels.

The spring-fed tributaries provide a perennial streamflow that covers and maintains a high quality steelhead nursery habitat. In San Pedro Creek, summer water temperatures range between 55°F and 65°F. The substrate of the creek provides shelter and escape cover along with a favorable habitat for aquatic benthic organisms.

The population of juvenile steelhead supported by the four miles of suitable nursery areas was estimated by the Department of Fish and Game at 20,000 steelhead in late August and early September 1973. This estimate was based on quantitative sampling conducted by the department during this period. The survey showed that the 2.6 miles of stream downstream of the South Fork supported approximately 75 percent of the juvenile steelhead population of San Pedro Creek.

The lower section of San Pedro which supports the majority of the juvenile steelhead population is subject to significant flow reductions caused by the water district's diversions on the

South and Middle Forks. Besides enduring the reduction of habitat, steelhead populations are subjected to water quality degradation in stream sections flowing through San Pedro Valley.

Pollution sources such as overflowing sewage during rain storms and street debris washed into the North Fork Culvert have contributed to the amount of organic pollution present in the main stem creek. Some fish kills have been reported in this area as a result of pollution.

III. Project Development

The North Coast Water District applied to the State Water Resources Control Board for permits to divert unappropriated water from the San Pedro Creek drainage in a series of three water rights applications (Nos. 16162, 22622, 23733).

The first application for diversion on the South Fork was granted in 1967. The permit issued for the application included terms requiring a minimum flow of 0.15 cfs at all times for the protection of fishlife. The water district's permit for water rights on the Middle Fork also included terms for a minimum instream flow of 1.3 cfs at all times. Both instream flow requirements were the results of the Department of Fish and Game protests to the water district's applications. The methodologies used by the Department of Fish and Game to determine minimum instream flows were not discovered in the data reviewed.

The latest application submitted by the water district (Application No. 23733) in 1971 is supplemental to existing water rights on the South Fork. The 1971 application was protested by the Department of Fish and Game on the basis that the proposed diversion in combination with the existing diversions would adversely affect the steelhead populations of San Pedro Creek by causing a significant reduction in streamflow. A summary of the amounts of water that is presently diverted and proposed for diversion is displayed on Table 1 along with the diversion seasons specified in the respective applications and permits.

Currently the State Water Rights Board has not issued a decision on the water district's proposed diversion (Application No. 23733). The application is in the process of a formal hearing and files and information on all the events connected with the project are not readily available.

Documents published concerning the proposed diversion include an Environmental Impact Report dated May 1974 that was prepared by the water district, and a Department of Fish and Game report to the State Water Resources Control Board dated October 1974.

The purpose of the Department of Fish and Game report was to request that terms providing for the protection of fishery resources affected by the proposed diversion be included in any permit issued to the district. Included in the report is a

Table 1

Summary of North Coast County Water District
Water Rights on San Pedro Creek, San Mateo County
(cubic feet per second)

Month	Middle Fork	South Fork			Total: WA22622 WA16162 WA23733
	WA22622[1./]	WA16162[2./]	WA23733[3./]	Total	
January	1.50	0.47	0.65	1.12	2.62
February	1.50	0.47	0.65	1.12	2.62
March	1.50	0.47	0.65	1.12	2.62
April	1.50	0.47	0.65	1.12	2.62
May	1.50	0.47	0.65	1.12	2.62
June	0.20	0	1.12	1.12	1.32
July	0.20	0	1.12	1.12	1.32
August	0.20	0	1.12	1.12	1.32
September	0.20	0	1.12	1.12	1.32
October	0.20	0	0.56	0.56	0.76
November	0.20	0	0.56	0.56	0.76
December	1.50	0.47	0.65	1.12	2.62

1./ Permit No. 15676; diversion initiated December 1973.

2./ Permit No. 11806, License No. 9038; diversion initiated in 1967.

3./ Proposed diversion.

Source: California Department of Fish and Game, 1975.

description of the existing fisheries resources and the methodologies employed in making minimum streamflow recommendations. The Department of Fish and Game was requested in 1975 to submit to the State Water Rights Board an addendum to the 1974 report. This presented a very detailed summary of the methodology and calculations used by the department in determining the minimum instream flow requirements of San Pedro Creek.

In order to determine the effect of proposed appropriations on existing fishery resources, the department first conducted an inventory of the fish population in August and September of 1973. Seven sections of the stream were electroshocked and block seines were used to create closed populations. Ranges of densities of juvenile steelhead at the various sampling areas are listed below in the number of steelhead per 100 feet of stream.

Main stem San Pedro Creek	64-186/100 feet
Middle Fork	221/100 feet
South Fork (above diversion site)	60/100 feet
South Fork (below diversion site)	55-178/100 feet

The fishery survey and ecological investigations revealed that significant populations of juvenile steelhead trout were present in the drainage during the spring and summer months. It was noted by the Department of Fish and Game that these fish would be adversely affected by any streamflow reduction during the spring and summer season. Adequate streamflows during the

months of March through May are especially essential for maintaining steelhead during egg incubation, hatching and fry emergence.

The amount of habitat that is available to juvenile steelhead during the critical low flow period in late summer was determined by the Department of Fish and Game to be the major limiting factor to steelhead production on San Pedro Creek.

In addition to reducing the habitat, flow reductions deteriorate water quality .

In order to quantify the habitat requirements of the juvenile steelhead populations in San Pedro Creek, the Department of Fish and Game conducted a series of stream profile transects in October 1973. The water district was diverting water during this survey and the South Fork was discharging 0.3 cfs.

Measurements were obtained at 14 stream profile transects. Stream width averaged 5.0 feet and ranged between 3 and 8 feet. Average depth was only 0.28 feet, critical riffle depth averaged 0.09 feet. Surface area was 0.3 acre.

Extensive stream surveys were conducted by the Department of Fish and Game in late July 1974, and the results were included in the report to the State Water Resources Control Board. Physical parameters such as stream width, depth, flow and surface area were measured and used to describe the stream.

The Department of Fish and Game determined minimum instream flow requirements for the San Pedro Creek drainage by the projected flow transect method. The design of the minimum flow was based on the assumption that flows sufficient for providing suitable steelhead habitat during the summer months would be adequate for maintaining steelhead and resident fish species during the spring, fall and winter months.

On the basis of the survey and calculations used in the projected flow transect method, the Department of Fish and Game made the following recommendations for minimum instream flow requirements to be included in any permit issued pursuant to Application No. 23733:

"1. Permittee shall at all times maintain a minimum streamflow of 1.3 cubic feet per second or the total flow of San Pedro Creek, whichever is less, at the Linda Mar Boulevard bridge and 1.7 cubic feet per second or the total flow of San Pedro Creek, whichever is less, at the State Highway No. 1 bridge to maintain fishery resources.

"2. Permittee shall at all times bypass a minimum of 0.15 cubic foot per second or the total flow of South Fork San Pedro Creek, whichever is less, at the point of diversion to maintain fishery resources.

"3. In accordance with Section 6100 of the Fish and Game Code, no water shall be diverted under this permit until the Department of Fish and Game has determined that measures necessary to protect fishlife have been incorporated into the plans and construction of such diversion. The construction, operation, or maintenance costs of any facility required pursuant to this provision shall be borne by the permittee.

"4. No water shall be diverted under this permit until permittee has installed devices, satisfactory to the State Water Resources Control Board, which are capable of measuring the flows required by conditions listed above. Said measuring devices shall be properly maintained."

Correspondence between the water district and the Department of Fish and Game indicates that both parties agreed upon the need for a minimum bypass flow of 0.15 cfs at the South Fork diversion. This bypass flow is augmented by natural discharge from one tributary and is sufficient to maintain the nursery habitat on the South Fork. However, streamflow in excess of 0.15 cfs is considered necessary by the Department of Fish and Game during the summer and fall for maintaining minimum streamflow requirements in the Middle Fork and the main stem San Pedro Creek, both downstream from the confluence of the South Fork. The instream flow requirements are pending on the final decision issued on Application No. 23733.

V. Conclusion

North Coast Water District operations in San Pedro Creek have reduced the natural instream flow, both by diverting water and allowing municipal and industrial growth in the San Pedro Valley. The increased water demand has led to added diversions -- first on the South Fork (1967), then on the Middle Fork (1973), and recently another proposed diversion on the South Fork. The preservation of the remaining steelhead in San Pedro Creek is greatly threatened.

The Department of Fish and Game has filed a protest on the most recent water rights application. In response to the situation, the Department of Fish and Game conducted transect

studies of flow and habitat. These resulted in recommended instream flow reservations. The effectiveness of these recent efforts to preserve steelhead cannot be analyzed until after the project is approved by the SWRCB with stipulations recommended by the Department of Fish and Game.

Considering the past minimum instream flow reservations made on the previous two projects, it appears that these flows were effective in maintaining the steelhead resources in the stream based upon the population estimates made by the Department of Fish and Game during the 1973 sampling program.

BIBLIOGRAPHY

Personal Communications

Anderson, Keith. 1976. California Department of Fish and Game.

Baker, Phillip. 1976. California Department of Fish and Game.

Emig, John. 1976. California Department of Fish and Game.

References

California. Department of Fish and Game. 1964. Some effects of potential water projects on the fish and wildlife of San Mateo County coastal streams. Water projects report S-1964. 43 pp.

----------. 1974. Report to the State Water Resources Control Board summarizing the position of the Department of Fish and Game on water application 23733, San Pedro Creek drainage, San Mateo County, California. 23 pp.